G. R. S. IX-5]

Previous references.

File No. 198.19.

1920.

Serial Nos 1-10, 10a
11-13.

(G.R.)

Later references.

GENERAL AND REVENUE SECRETARIAT

Serial Nos. Fourteen only

Part B for Nov 20.

SUBJECT.

Invention for improvements in or relating to Sand-filters by Mr Neil McKechnie of 28 Brackley Road, New Beckenham, Kent, England.

Sec 13) 20. The Supt, Govt Museum
" Chief Engineer
" Secy to the Board for Chemical Research.

No G 9707 B/3 18th Nov 20.

For a copy of the specification of the invention

Asst
30/4

WD 2228—GPB—20,000—14-6-20

33

1768

G. R. S. III—1] 1919-20

GENERAL AND REVENUE SECRETARIAT.

(Gen.)

NOTES.

File No. 198-19

FILE HEADING:

Invention for "Improvements in or relating to sand filters" by Mr. Neil McKechnie Barron of 28, Brackley Road, New Beckenham Kent, England.

From

Messrs. Remfry & Son, Calcutta.

Letter No. nil Dated 6.4.1920 Received 12.4.1920

Diary No. 1768	Enclos. 2 Spare Copies.	Serial No. 1

BRIEF ABSTRACT OF LETTER.

Forward an application, together with a Power of Attorney authorising them to act on behalf of the applicant and advise remittance of a fee of Rs 11/ and request leave to file a specification of the invention referred to above.

NOTES AND ORDERS.

The money has been received. (Vide M.O. coupon in G.R. file no. 198-19.)

The P.R.R. is put up, duly entered. Submitted with the usual drafts.

P.R.R. for sanction in G.R. file no. 198-19

16.4.20

Issue

17/4/20

NOTES—First Sheet.

G. R. S. III-2]

General and Revenue Secretariat.

Gns 218 185

Gm File No. 198 of 1919.

Serial No.	
2	From the Hr/Sty: offr: Sty: No. 2445 D/21.4.20 Acknowledges the receipt of Rs 10 refd. to in Sl 1
3	To the Supdt: of ~~Post Cards~~ Stamps G. 24128 D/22.4.20. Forwards the Power of Attorney for being impressed with the above Stamps
4	To the Secy: to the Bd: for Chief Ex: Rec: G. 24129 D/22.4.20. Forwards for opinion of the board the Apstn: refd. to in Sl 1.
5	From The Supdt. of Stamps. Letter no. 412 dated 26.4.1920. Returns duly stamped the Power of Attorney referred to in Sl 3. A draft acknowledging is put up in Gen. file 197-19. 3/5/20
6	3.5.20. To the same officer No. Gen 5534 dated 7.5.1920. Acknowledges the receipt of the Power of Attorney refd. to in Sl 5.

Sus)

NOTE—Contn. sheet.

G 26941 D 1/6 to Sty. Chief Ex: Rec: Bd

G. R. S. 12]

20446
3042 (3

General and Revenue Secretariat.

G.M. File No. 198 of 1919-20.

Serial No.	
	From The Secretary to the Board for chemical and Industrial Research and Scientific advice. Letter no 193 dated 7.6.1920. States that the report called for in Sl. 4 above will be sent in due course. Submitted. The report may be awaited. 10.6.20. Yes 11/6/20. R. No. G 1661 of 22/7
7	From The Secretary to the Board for Chemical and Industrial Research and Scientific Advice. Letter no 1 dt 23-8-1920 With reference to Sl. 4 states that leave may be granted to file a specification of the invention. Submitted with the usual drafts for approval. 26.8.20 (2nd Member) 26/8/20. Drafts approved 30.8.20
8	To Messrs Rempsy & Son G. 5078 of 2.9.20. Authorises the filing of the Specification of the invention refd: to in Sl

1320-319
28.8.20

NOTE—Contn. sheet.

GPB—70,000—17-12-15

G. R. S. III-21

General and Revenue Secretariat.

fm File No. 198 of 1919-20.

Serial No.	
9	To Messrs Remfry and Son. Letter No 9 5072 dt 2.9.1920. Forwards a copy of G.O authorising the applicants to file a specification of their invention and requests that the facts may be communicated to the party concerned fm
10	Messrs Remfry and Son. Letter dt 11.10.20 Forwards the G.O together with the filing fees and the copies of the specification and request that the necessary certificate may be granted Submitted with the usual 3 drafts note the 21st duly entered. The certificate above and if the G.O.s require signature 8/11/20 Issue Dcg 8/11/20.
10(a)	From the Asst: Treasury Officer— Letter dt No 315 dated 13th Nov 20 Acknowledges the receipt of Rs 30 refd. in above
11	To The Compiler Mysore Gazette— S.9705 dt 18.11.20. Notifies the filing of the Specification of the invention.

NOTE—Contn. sheet.

DIARY NO. 17680

REGISTERED.

Sgn 198-19-1 (6)

To

The ~~CONTROLLER OF PATENTS~~, SECY TO THE GOVT OF MYSORE,
~~PATENT OFFICE,~~ GENL. & REV. DEPTS.,
~~CALCUTTA.~~ BANGALORE,
MYSORE.

12 APR 1920

From

REMFRY & SON,
PATENT & TRADE-MARK ATTORNEYS,
CALCUTTA.

27683

CHIEF SECRETARIAT IV MINOR Depts. 12 APR 1920

Dated CALCUTTA, the 6th April 1920.

DEPT.	P.	FILE LR.	M.
FILE INDICATION			
Mysore Pats. (Genl)			

Sir,

re N. Mc. BARRON. (MYSORE)

(Brit. Pending No. 8402/19 *dated* 3/4/19).

We have the honour to forward herewith an Application of NEIL McKECHNIE BARRON, of 28, Brackley Road, New Beckenham, Kent, England, Engineer, for leave to file a Specification under Part I of the Mysore Inventions and Designs Regulation, 1894, in respect of an Invention for "IMPROVEMENTS IN OR RELATING TO SAND-FILTERS", and solicit the favour of your submitting the same to H.H. the Dewan.

The Power of Attorney under which we are acting is also enclosed and we solicit the favour of your having such Power of Attorney stamped Re.1/-.

A Post Office Order for Rs.11/- is also sent today-

The corresponding British Patent Pending No. 8402/19 dated 3/4/19.

We have the honour to be,
Sir,
Your very obedient servants,

Enclos:-
Appln.
P/A.

By P.O.O:-
Rs.11/-/-.

MYSORE APPLICATION.

I.M.B.

P/O (Genl.) 1,000—7-6-18 [4-2-14—17-3-11].

MYSORE.

1

APPLICATION.

TO THE DEWAN OF MYSORE.

The Application of NEIL McKECHNIE BARRON, of 28, Brackley Road, New Beckenham, Kent, England, Engineer, for leave to file a Specification under Part I of the Mysore Inventions and Designs Regulation, 1894.

1. The Applicant is in possession of an Invention for "IMPROVEMENTS IN OR RELATING TO SAND-FILTERS"; he is the Inventor thereof; and to the best of his information and belief, the Invention is new within the meaning of Part I of the Inventions and Designs Regulation, 1894, and no circumstance exists which, if the Applicant is authorised to file a Specification and files it in accordance with that Part, will disentitle him to an Exclusive Privilege thereunder in respect of the Invention.

The Applicant has applied for a Patent in the United Kingdom in respect of this Invention , No. 8402 dated the 3rd day of April 1919. See Illustrated Official Journal (Patents) No. 1577, page 374.

2. The following is a description of the Invention:-

Barron - 6/3/20
(Combined)

This invention is for improvements in or relating to sand-filters and has for its object to provide a filter which shall permit of a rate of filtration through the sand surface approximating to that of a slow sand-filter whilst only occupying space approximating to that taken up by a mechanical filter, and shall not be so expensive in operation as the well-known slow sand-filters, nor with such a high rate of filtration and its consequent danger as the mechanical filters, but nevertheless to provide a filter in which the sand shall be as quickly and more efficaciously cleaned than is possible with mechanical filters.

A sand-filter according to this invention has in combination a sand-chamber, an inlet for unfiltered water at the top of the chamber, sand-excluding outlet-means for filtered water at the bottom, means for admitting sand at the top and an outlet for sand at the bottom whereby the sand can be flushed out and fresh sand run in when entire cleaning is required.

Preferably the filter comprises two superimposed units each with upper and lower conduits for changing the sand, sand-excluding means for passing the filtered water from the upper unit to the lower unit, and means for delivering filtered water from the lower unit to the discharging-conduit, which two units thus constitute a single filter so arranged that when the sand in one unit is being changed, that in the other may remain undisturbed.

Further, means may also be provided for admitting filtered water under pressure to the delivery means for

filtered water from the one unit, or from each unit if two are employed.

Preferably the sand-chamber of the filter contains a plurality of sand-excluding perforated tubes whose lower ends extend beyond the bottom of the said chamber or deliver into a chamber shut off therefrom by sand-excluding means, for instance into a second unit containing sand, each tube being surrounded by a larger sand-excluding perforated tube whose upper ends are connected together by a sand-distributing plate which partitions off the upper part of the sand-chamber into which the tops of the larger tubes open.

The invention also includes other features, such as particular constructions of perforated tubes; means for securing the tubes in situ; a general arrangement of filtering units in the form of a battery of filters; and these and other features of the invention will be more clearly understood from the following description taken in connection with the accompanying drawings in which,

Figure 1 is a central sectional elevation of one preferred embodiment of a filtering device comprising two superimposed units;

Figure 2 is a section on the line 2 - 2 of Figure 1;

Figure 3 is a central sectional elevation on an enlarged scale of a pair of perforated tubes;

Figures 4 and 5 are sectional views on a still further enlarged scale of details of the construction of the filter-tube shown in the preceding figures;

Figure 6 is a part central sectional elevation of a modified construction of filter-tube to an enlarged scale;

Figure 7 is a section on the line 7 - 7 of Figure 6;

Figure 8 is a diagrammatic illustration of two filter elements and their connection with the sand-cleaning and delivery-devices of a battery of filters, and

Figure 9 is a plan of a battery of filters, of which two elements are shown in Figure 8.

Like letters indicate like parts in the accompanying drawings.

In Figure 1, the general arrangement of parts in the preferred construction is illustrated, and only those filter-tubes whose axes fall on the centre line 1 - 1 of Figure 2 are illustrated, the other tubes having been omitted for the sake of clearness.

The filter illustrated comprises two superimposed chambers designated generally by the reference letters A and B. They are shown as constructed of cylindrical form, and each is built up of several annuli of suitable material welded or otherwise connected to produce the cylindrical chambers required. The upper chamber is provided with a top sand-distributing plate A^1, a bottom-plate A^2 and an auxiliary or false bottom-plate A^3. The bottom-plate A^2 constitutes a top plate for the chamber B, which is in its turn provided with a bottom-plate B^1 and an auxiliary or false bottom-plate B^2.

In the upper chamber A are a number of perforated

filter elements each comprising an outer tube C and an inner tube D, the construction of both of which is similar and will be described in detail hereinafter.

The outer tubes C are secured to and open through the plates A^1 and A^3 respectively, so that a free passage is afforded between the chamber above the top plate A^1, hereinafter referred to as the chamber TC, and the chamber below the bottom plate A^3, hereinafter referred to as the chamber LC, through the space between the outer tube C and inner tube D. Each of the latter tubes D is closed at its upper end by a cap D^1, but its lower end communicates with an orifice in the plate A^2 and is provided at D^2 with a water-deflecting device to prevent the water, issuing from the tubes D, from disturbing the surface of the sand bed in the part B. Such a device is shown in Figure 3 as provided with a deflecting surface DS on to which water from the tube D will be discharged and spread over the bottom sand bed.

Perforated nozzles A^6 secured to the plate A^3 communicate between the chambers CC and LC and are provided for the purpose of preventing air-lock when the sand is being run in as hereinafter described.

The inter-tubular portions of the plates A^1 and A^3 (with the exception, in the latter case, of the nozzles A^6) are solid, so that the only communication between the chambers TC and LC is through the passages between the tubes C and D, as previously stated.

Centrally of the plate A^1 is a conduit E providing open communication between the chamber TC and the central portion CC, located between the plates A^1 and A^3.

Leading into the upper end of the upper chamber is a valve-controlled inlet conduit F (for unfiltered water) delivering into a deflecting chamber F^1 which is within the chamber and has one side F^2 lower than the other sides for the outlet of the unfiltered water into the chamber TC. Thus the incoming water is deflected so as to discharge above the sand bed more or less circumferentially thereby preventing disturbance of the surface of the sand bed. There is also a sand-inlet conduit SI and a valve-controlled outlet SO for water employed in scouring the sand in the chamber A. The scour water passes as shown into a "trap" ST before it can be admitted to the conduit SO, the trap ST preventing the water from carrying sand away with it.

The bottom plate A^2 is of inverted conical formation, and at its lowest point terminates in a conduit G for the discharge of the sand from the upper chamber when it is desired to remove it and replace it with clean sand. In the conduit G is an ejector-nozzle G^1 communicating with a conduit G^2 supplied through a conduit G^3 with water under high pressure. The extremity of the conduit G, where it projects through the side of the chamber B, is closed by a cap G^4 provided with a two-way cock which in one position completely closes the outlet G, but in its other position admits the passage of water through the cock without, however, permitting the passage of sand.

The lower chamber B is provided with a valve-controlled outlet-conduit H for filtered water; a sand-outlet conduit I opening in the bottom plate B^2 and having

in it an ejector-nozzle I^1 similarly constructed and for the same purpose that the conduit G and nozzle G^1 are provided for the upper chamber. The nozzle I is supplied with water under pressure through a conduit I^2, which also receives its supply of water through the conduit G^3, and a cap I^3 is provided with a cock similar to that described in connection with the cap G^4; a valve-controlled outlet J opening through the bottom plate B^1 for removal of waste water; a sand-inlet SI^1 and a man-hole K. Sand-excluding devices B^3 are provided in the lower chamber B for the purpose of permitting the passage of water through orifices in the plate B^2 which orifices are controlled by the devices B^3. The filtered water thereby escapes through the devices B^3 and plate B^2 to the outlet-conduit H.

There is also provided a valve-controlled conduit SC for the admission of filtered water under pressure for scouring the sand in the upper chamber A.

In one form illustrated in detail in Figures 3, 4 and 5, the tubes C and D are each composed of a number of vertical wires spaced apart by spacing-devices.

Figure 4 shows, in section, a portion of the outer tube in which wires C^1 of "coffin"-shaped cross-section are held by one or more pairs of spacing-rings disposed at intervals in their length, these rings being shown at C^2 and C^3 with their opposing surfaces formed with teeth engaging between the wires C^1 and secured thereto, preferably by welding. The thickness of the upper ends of the wires C^1 is preferably reduced as at C^4 and these ends are welded to a ring C^5 having its upper edge of wedge-shaped

cross-section. The lower ends of the wires at C^6 are similarly reduced in thickness and are welded or otherwise secured to a ring C^7, also of wedge-shaped cross-section.

The inner tubes D are similarly composed of wires of "coffin"-shaped cross-section D^3, held between toothed rings D^4 and D^5. The wires D^3 are reduced in thickness at their upper ends and are welded to the cap D^1 as shown, and over the latter the central boss of a spider D^6 makes an easy sliding fit. The spider supports at the outer ends of its arms a ring D^7 of such a section as to co-operate in a wedging action between the ring C^5 and a ring A^4 secured by means of a bolt A^5 to the sand-distributing plate A^1. The lower ends of the wires D are reduced in thickness and bent round at right-angles as at D^8 so as to be gripped between and welded to rings D^9 and D^{10}. The water-deflecting device D^2 is held to the lower ends of the tubes by means of bolts D^{11} which pass through the bottom plate A^2 and tubular spacing-pieces D^{12} and D^{13}, finally to engage with the compound end D^8, D^9, D^{10}. The construction is such that the parts D^8, D^9, D^{10}, D^{12}, D^{13} and the plate A^2 are held together so as to form a continuous tubular connection with the lower end of the inner tube D.

It will be seen, therefore, that in each pair of tubes C and D, the inner tube is held between the lower plate A^2 and the central boss of the spider D^6 and at the same time the ring D^7 carried by the spider D^6 positions and retains the upper end of the outer tube C as shown. The lower end-ring C^7 of the outer tube C is received by a

socket C^8 secured by bolts C^9 to the plate A^3. The wedging ring D^7 is driven home into position by the application of a requisite force or by blows delivered on to its upper end.

The wires C^1 and D^3 are spaced apart sufficiently to allow water to percolate between them, without however permitting the passage of sand, and it is found that wires of "coffin"-section such as those illustrated are particularly suitable for this purpose. It will be noted, however, that the position of closest proximity between a pair of adjacent wires in the outer tube C is nearer the inner surface of the tube, but that this position is reversed in connection with the inner tubes D, that is to say it is nearer to the outer surface of the tubes. As each pair of tubes is of similar construction, the foregoing description applies to all the pairs of tubes C and D employed in the filter.

Communicating with a conduit L are a number of conduits L^1 arranged close to and parallel with the outer tubes C and perforated at intervals throughout their length. The lower ends of these conduits are closed and rest on the nozzles A^6. Water under pressure can be supplied through the conduits L^1 to spray against the outer surfaces of the tubes C for the purpose of cleansing them.

When using the apparatus as a pressure filter, a top cover A^7 is conveniently provided securely held in position by any suitable means.

The operation of the filter so far described is as follows:-

When filling the upper unit A with sand the cock in the cap G^4 is operated to permit the passage of water therethrough without the passage of sand as hereinbefore described. Sand is then run in with water through the sand-inlet SI and spreads over the distributing-plate A^1 whence it runs down through the spaces between the tubes C and D into the chamber LC. The latter chamber and the conduit G become completely filled (the nozzles A^6 preventing any air-lock) as are also the spaces between the tubes C and D. Sand and water are continued to be run in until the sand above the plate A^1 has attained sufficient depth and is approximately at the level indicated by the dotted line SL in the drawings. During the filling in of the sand and water, some of the water passes out through the cock in the cap G^4 and some passes through the sand in the space between the tubes C and B into the inner tubes and escapes by them into the chamber B. When a layer of sand of the required thickness has been deposited above the plate A^1 the supply of sand and water is cut off and the cock in the cap G^4 is turned to the closed position to prevent further escape of water.

The bottom unit B is similarly filled by running in sand and water through the inlet SI^1 until sufficient sand has been deposited to a level substantially to that shown at SL^1 in the drawings just beneath the outlet conduit G. The water which is run in with the sand escapes through the sand-excluding outlets B^3 and through the conduit J and the cock in the cap I^3. When the required amount of sand has been run in, the cock in the cap I^3 is closed to prevent any further escape of water through the conduit I. In the manner just described the filling of the two portions of the filter can be effected with considerable rapidity.

The filter unit is now ready for filtering, say, water. All the conduits are closed with the exception of the conduits F and H and unfiltered water is run in through the conduit F. The bulk of the water rises in the chamber TC and overflows through the conduit E into the chamber CC; thence it passes through the tubes C, through the layer of sand between them and the tubes D and finally into the interior of the tubes D and through the outlets D^2 into the chamber B. A portion of the water flows directly through the sand bed on the plate A^1 into the space between the tubes C and D and thence to the chamber B, and a further portion flows through the perforated nozzles A^6 through the sand in LC and the lower ends of tubes D to chamber B. All the water from the chamber A percolates through the sand bed in the bottom chamber B and filtered water escapes through the sand-excluding devices B^3 to the filtered water outlet H.

Except when first charging the filter new sand is never supplied simultaneously to both units. This is an important feature as it prevents accident from a too free passage of the water when the sand is clean. Thus, if the sand in the upper unit is to be changed, that in the lower unit has become provided with a skin and is not disturbed, so that even though the water may for a time pass somewhat freely through the first unit, it meets with resistance through the skin and partially clogged sand of the second unit, and by the time the sand in the second unit requires cleaning a skin has been formed in the first unit.

To change the sand in either unit, the filtered water outlet H is shut off and the cap G^4 or I^3 is removed.

The whole of the sand can be then run out through the conduit G or I aided by the admission of water under pressure through the ejector-nozzle G^1 or I^1 respectively. Refilling with sand and water can then be effected in the manner described above.

If it is only required to remove the skin which has formed on the surface of the sand in the upper unit without removing the sand from the filter, the unfiltered water supply is shut off and the scour-outlet SO is opened. Filtered water under pressure is admitted through the conduit SC and travels up the inner tubes D and outwards through the sand and the outer tubes C, carrying with it the clogged material forming the skin. The scouring water passes out from the chamber A through the valve-controlled scour-outlet SO and as soon as sufficient scouring has been effected the filtered water is shut off and filtering proceeds as before.

Water under pressure can also be sprayed through the conduits L^1 to cleanse the interstices of the tubes C. It is not usually desirable to scour the sand in this manner in the lower unit, the lower waste-pipe J being only intended for releasing the water which may have collected between the plates B^1 and B^2 when filling the chamber with sand, or to run the first filtered water to waste - if desired - when the filter is started in the first instance or restarted after scouring. If, however, it should be desirable that the sand in the bottom chamber be capable of being scoured, a scour-outlet, and an inlet for filtered water would be provided for the chamber B similar to the conduits SC and SO provided for the chamber A.

Figures 8 and 9 illustrate an arrangement for a battery of filtering units in which seven units composed of upper and lower units A and B are arranged around a central sump M. Pipes N fixed at the base of the sump M serve to support at their upper ends a sand-container O and also serve as conduits for delivering clean sand to the sand-inlet conduits SI^1 for the lower chambers B, as will be explained hereinafter.

Clogged sand from the chambers A and B, when it is removed through the conduits G or I, (after removal of the cap G^4 or I^3 respectively) passes into the sump M from which it is returned to the container O through a sand-washing and elevating-system of known general type in which washing is carried out by means of a counterflow of water. This apparatus is so arranged, according to this invention, as to wash and elevate the cleaned sand to a container from which the clean sand is distributed, as and when desired, to the filter units. The container O is of such capacity that it can accommodate an approximately sufficient supply of sand to fill at least one of the filter-chambers or units and in it there is always maintained a reserve supply of sand for charging into the filter-units. This system is indicated by a series of buckets P into which the sand is successively elevated through pipes Q by means of injectors R^3 supplied with the water under pressure through the pipe R. The pipe R receives its supply from a chamber R^1 supported on the pipe O^2 below a tubular extension O^1 of the container O, a pipe R^2 supplying water under pressure to the chamber R. The counterflow water for washing purposes is delivered

through a pipe O^2 to branch-pipes O^3 which in their turn deliver water to the buckets beneath perforated false bottoms. The upper end of the pipe O^2 communicates with the bottom of the extension O^1 and the water supplied to the pipe O^2 is that which drains from the washed sand elevated into the container O augmented with water from pipe R^2 which is preferably connected to it for "make-up" purposes. Sand and water are together withdrawn from a point near the bottom of one bucket and are forced upwards and discharged into the upper end of a bucket above and so on in succession. The topmost bucket is preferably well below the container O so as to necessitate a large proportion of pressure water for lifting the sand to pass with the latter into the hopper. The clean sand can then be delivered to any pipe such as SI or SI^1 (serving as the sand-inlet conduit for the upper or lower chamber respectively) from the tubular extension O^1 and can be forced therethrough by means of injectors S and S^1 respectively receiving a supply of water under pressure from the chamber R^1. Cocks controlling admission of water to injectors S and S^1 are shown at S^2 and S^3.

The overflow from each bucket is carried through a branch pipe P^1 to a dirty water outlet conduit P^2 and this conduit, together with an overflow conduit from the sump M (not shown), the scour-outlet conduit SO and waste-pipe J and similar conduits, can all discharge into a dirty water main not illustrated in the drawings but generally at or below the ground-level. An overflow is also conveniently provided for the container O and is

shown as consisting of the upper end of the conduit P^2.

Obviously all the pipes of the same character, for example all the pipes H or all the pipes F, could be connected to a common main, although for the sake of clearness such main pipes have not been illustrated.

By constructing the container O of sufficient capacity to hold a reserve supply of sand approximately, at least, equal to that required for filling any one of the filter-units it is possible rapidly to empty dirty sand from and to re-charge clean sand to any one of the filter-units. Thus, assuming the sand in a top chamber A is to be changed, sand is expelled from that chamber through the conduit G by means of a pressure-ejector G^1 and this is effected extremely rapidly. Fresh sand can then be equally rapidly charged into the chamber through the conduit SI with the aid of the pressure-injector S, a sufficient quantity of sand being held in reserve in the container O for this purpose. Were it not for the capacity of the container and the reserve supply of sand it would be necessary to wash the dirty sand removed from the chamber and gradually to re-charge it back to the filter-unit. This is a slow procedure and causes considerable waste of time which is now overcome by the present invention. The container O is preferably raised at a sufficient height in relation to the filter-units that each sand-outlet from the container is above the level of the sand-inlet in the filter-unit through which sand is charged into the latter from the container. Moreover, by reason of the tubular extension O^1 the reserve supply of sand remains

substantially undisturbed by the inflow of cleansed sand through the conduit Q. This permits an unimpeded action during the charging of the clean sand into the filter-unit. Obviously a similar effect could be obtained by the use of a chamber which need not necessarily be formed with an extension such as O^1 but is constructed of sufficient depth to accommodate, at its lower end, a sufficient quantity of sand so that the latter may remain practically undisturbed.

Figures 6 and 7 illustrate a modified form in which perforated tubes, such as C or D, can be constructed. Each of such tubes is constituted by two co-axial tubes T, U, formed with a plurality of slots T^1 and U^1 respectively extending in an axial direction and spaced apart circumferentially leaving solid interslot portions. The slots preferably do not extend over the major axial length of the tubes, but are in lengths separated by solid annular portions T^2 and U^2 respectively for strengthening purposes. These solid portions are "swelled" out on either or both the tubes T and U to give clearance for the filling bodies (hereinafter described) to pass down. In the drawing the solid portions of the tube U are shown as "swelled" out only.

When the tubes T and U are assembled the slots T^1 and U^1 respectively are not in radial alignment but the tubes are so arranged that in a radial direction a slot T^1 is opposed by a solid interslot portion of the tube U and <u>vice versa</u>. Between the tubes T and U are disposed rows of small bodies, preferably of spherical form, which may be composed of stone, porcelain,

metal or glass for example. These bodies are vertically above one another in each row and are retained in this relationship by either the slots T or U. In the illustration, portions of the bodies V are shown as projecting through the slots U which serve to guide them and at the opposite end of their diameters these bodies are guided against the solid interslot portions of the tube T. The interstices between the bodies V serve to permit the passage through them of water but not of sand, the latter being retained between the inner pair of tubes and an outer pair of tubes such as T and U in a similar manner to that in which it is retained between the tubes C and D previously described.

It will be appreciated that the perforated tubes employed in the filter-units may be of other constructions than those described in the foregoing specification, and it will also be appreciated that the specific embodiments described are by way of illustration only and not by way of limitation.

The strips such as C^4 or D^3, instead of being spaced apart by means of co-operating toothed rings as described, could be spaced apart by suitably slotted or perforated annular plates.

It is also within the present invention to employ either the top chamber A or the bottom chamber B with its attendant parts separately as a filter unit, provided that in all cases the unit comprises a sand-chamber, an inlet for unfiltered water at the top of the chamber, a sand-excluding outlet-means for filtered water at the bottom, means at the top for flowing sand in with water, and an outlet for the sand at the bottom, for the purpose of changing the sand as hereinbefore described.

HAVING NOW particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:-

1. In a sand-filter, the combination with a sand-chamber, an inlet for unfiltered water at the top of the chamber, and sand-excluding outlet-means for filtered water at the bottom, of means at the top for flowing sand in with water, and an outlet for sand at the bottom, for the purpose of changing the sand as described.

2. A sand-filter according to claiming-clause No. 1 comprising two superimposed units each with upper and lower conduits for changing the sand and having the sand-excluding outlet-means for filtered water at the bottom of the upper unit in communication with the top of the lower unit, and means for delivering filtered water from the lower unit to the discharging conduit, the said two units thus constituting a single filter so arranged that when the sand in one unit is being changed that in the other may remain undisturbed.

3. A sand-filter according to claiming-clause No. 1 or No. 2 wherein means are provided for admitting filtered water under pressure to the filtered-water delivery-means at the bottom of the sand-chamber, or if two units are employed, at the bottom of each unit, for scouring purposes.

4. A sand-filter according to claiming-clause No. 1 wherein the sand-chamber contains a plurality of sand-excluding perforated tubes whose lower ends extend beyond the bottom of the said chamber or deliver into a chamber shut off therefrom by sand-excluding means, each tube being surrounded by a larger sand-excluding perforated tube whose upper ends are connected together by a sand-distributing plate which partitions off the upper part of the sand-chamber into which the tops of the larger tubes open.

5. A sand-filter according to claiming-clause No. 4 wherein the bottoms of the larger tubes are carried by a false bottom in the sand-chamber, the said tubes opening into the space beneath the false bottom which space communicates with the sand-outlet.

6. A sand-filter according to claiming-clause No. 1 wherein coaxial perforated tubes are employed with a sand layer disposed between them for filtering the water, characterised by means for spraying water under pressure on to the outer surfaces of the outer tubes aforesaid, for the purpose of cleansing those surfaces.

7. A sand-filter according to claiming-clause No. 1 characterised by the provision of a pressure-ejector or injector (for example such as G1, I1 or S, S1) in the sand outlet or inlet respectively of either or both of the upper and lower chambers.

8. A sand-filter according to claiming-clause No. 4 or No. 5 characterised by a water admission conduit for unfiltered water communicating between the chamber containing the outer tubes and the space above the sand layer on the top of the aforesaid sand-distributing plate whereby unfiltered water is caused to overflow from the top sand bed and through the said conduit into the chamber containing the outer tubes.

9. A sand-filter according to claiming-clause No. 4 or No. 5 characterised by both the inner and outer perforated tubes being composed of vertical strips, preferably of "coffin"-shaped cross-section, and a spacing device, for example a perforated annular plate or a pair of co-operating toothed rings such as the rings C^2, C^3 or D^4, D^5, for retaining the strips of each tube in their proper circumferentially spaced relationship.

10. The subject-matter of claiming-clause No. 4 characterised by spiders, (for example D^6) one for each pair of tubes, operatively connected to the upper end of the inner tube and having an outer peripheral annular rib the lower edge of which is of wedge-shaped cross-section and is adapted frictionally to engage between co-operating wedge surfaces formed on or connected with the upper end of the outer tube and the sand-distributing plate aforesaid, with or without a retaining ring

engaging the lower end of the outer tube, the engaging surfaces between the ring and the tube end being wedge-shaped, and means to secure the ring to the aforesaid false bottom of the upper chamber.

11. A sand-filter according to claiming-clause No. 4 or No. 5, characterised by a construction of the perforated tubes comprising, for each tube, two concentric cylinders having in them a plurality of elongated slots extending in an axial direction and spaced apart around their peripheries, and spherical or other bodies in the space between the said cylinders wherein they are located in vertical rows by a portion of each of the said bodies extending into and through the aforesaid slots.

12. A construction of the subject-matter of claiming-clause No. 11 characterised by the concentric cylinders aforesaid being so connected together that the slots in one of them are opposed in a radial direction by solid interslot portions of the other.

13. For a sand-filter plant comprising a plurality of filter-units the combination of a sand-container which is raised above a sand-sump and is of such capacity as to accommodate an approximately sufficient supply of sand to fill at least any one filter-chamber, sand washing and elevating mechanism (for example the parts associated with the buckets P)

for elevating dirty sand from the sump and discharging the cleansed sand to the said container, and means (for example conduits SI and SI^1 and injectors SS^1) for transferring clean sand from the container to any one or more of the filter-units, for the purpose described.

14. The subject-matter of Claim 13 characterised by the container having a portion (such as L^1) at its lower end such that, or being of such a depth that, the sand contained in the said lower portion will remain substantially undisturbed by the admission of cleansed sand from the elevating and washing mechanism, and the means for discharging the sand into the filter-unit being connected with the said lower portion of the container.

15. A single- or double-chamber sand-filter substantially as described or substantially as illustrated in Figures 1 to 5 or Figures 6 and 7 of the accompanying drawings.

16. A sand-filter plant combined with means for the collection, washing and elevation of dirty sand and distributing means for the clean sand, arranged and operating substantially as described in connection with Figures 8 and 9 of the accompanying drawings.

3. The Applicant, therefore, applies for leave to file a Specification of the Invention pursuant to Part I of the Mysore Inventions and Designs Regulation, 1894.

Dated this 5th day of March 1920.

Neil McKechnie Barron.

I, NEIL McKECHNIE BARRON, the Applicant above-named do declare that what is stated in this Application is true to my knowledge, except as to matters stated on information and belief, and as to those matters I believe them to be true.

Neil McKechnie Barron.

Fig.2.

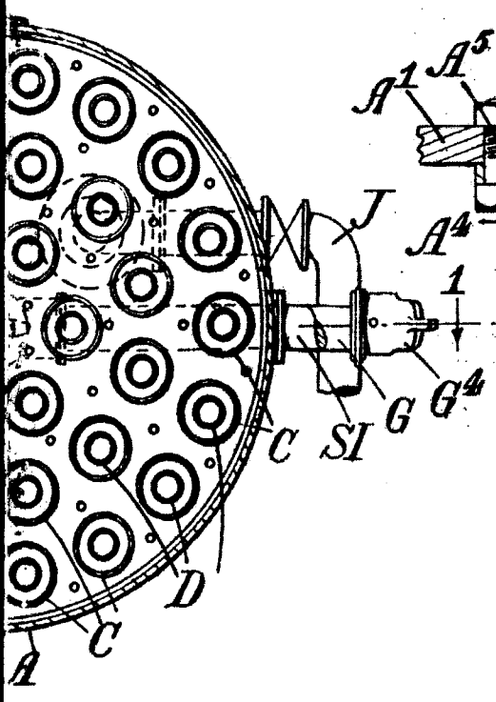


Fig.3.

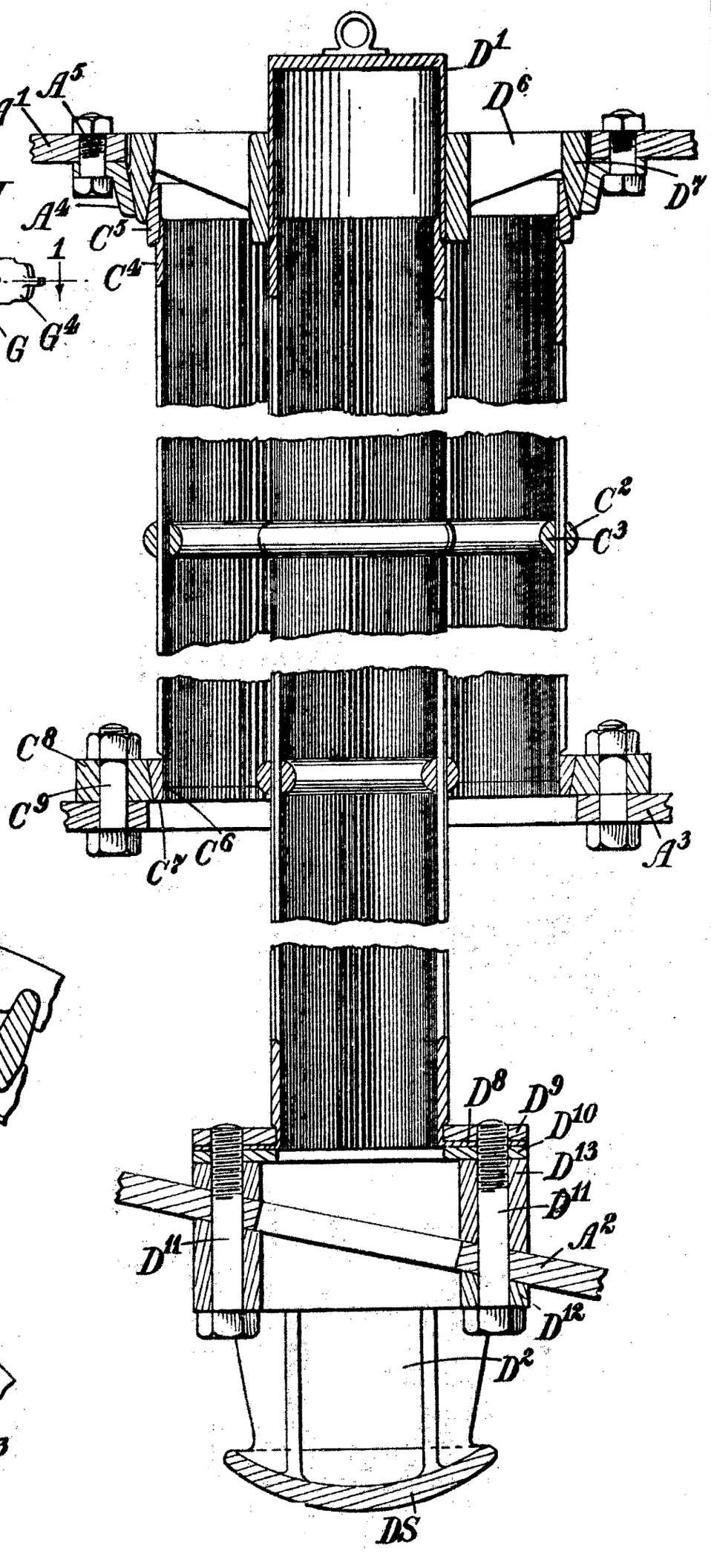


Fig.4.

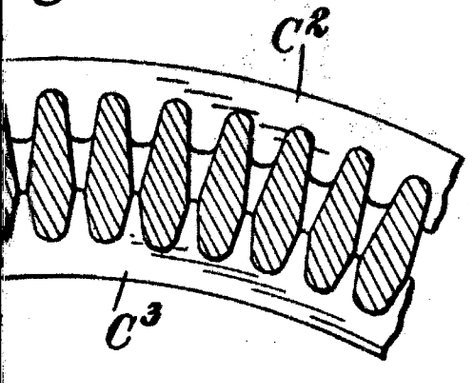


Fig.5

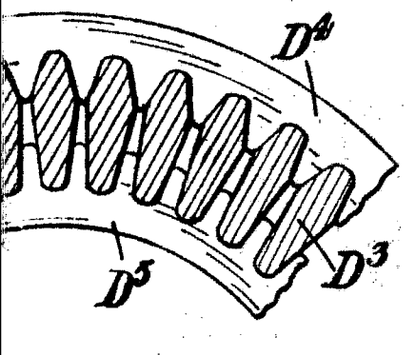
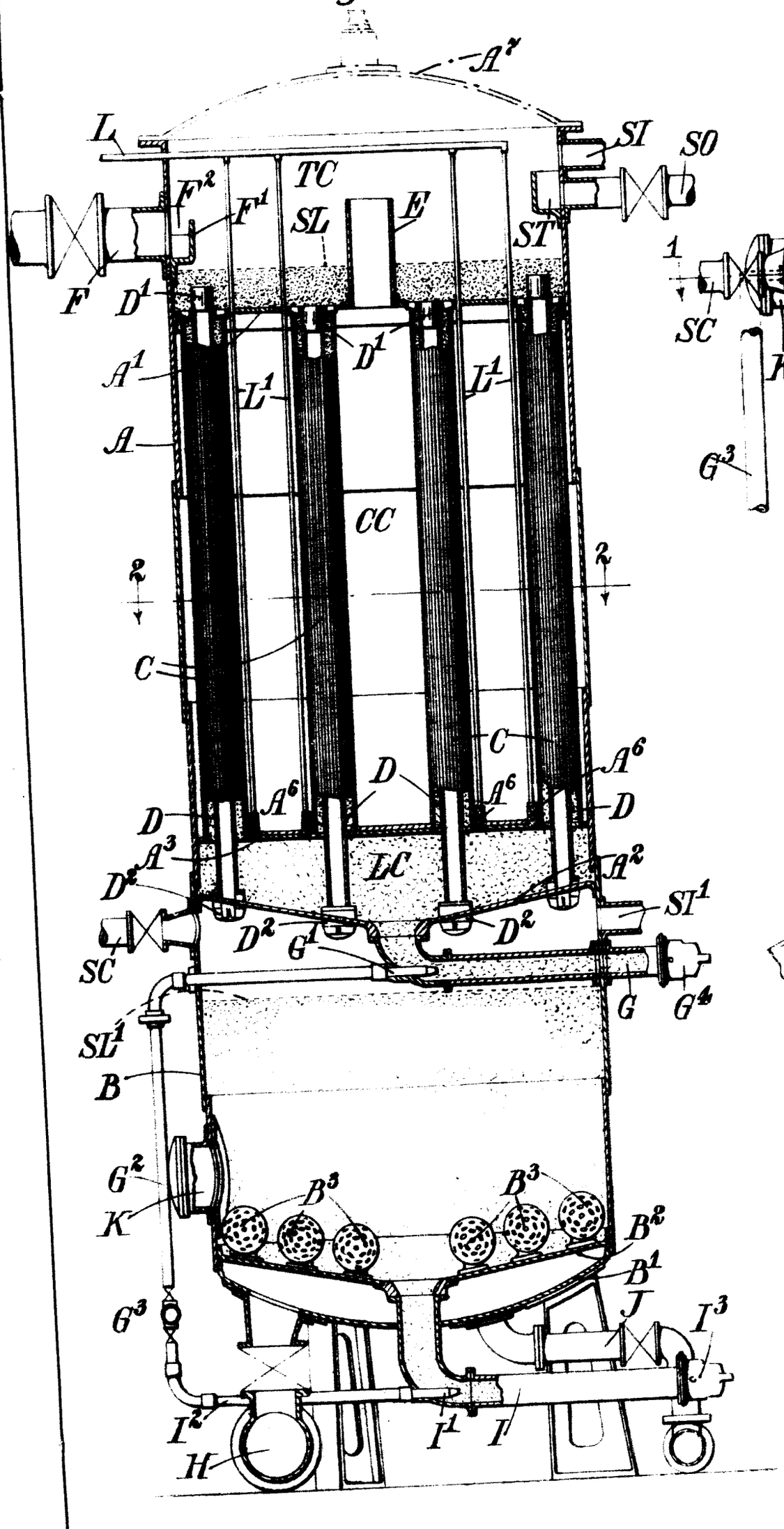


Fig. 1.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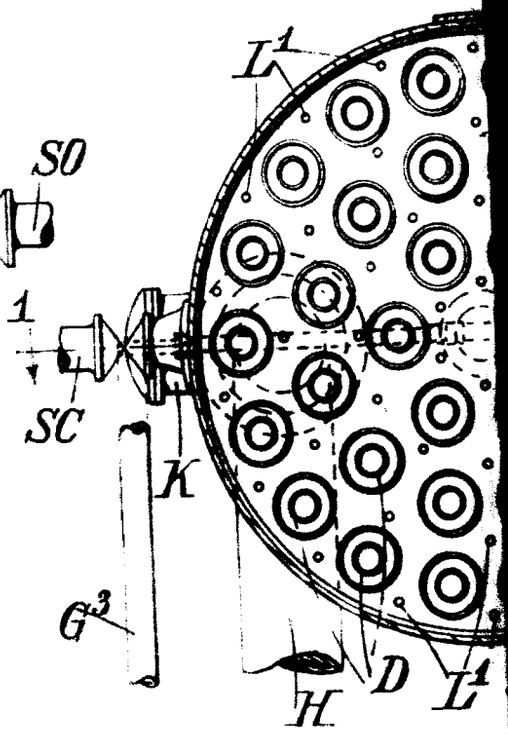
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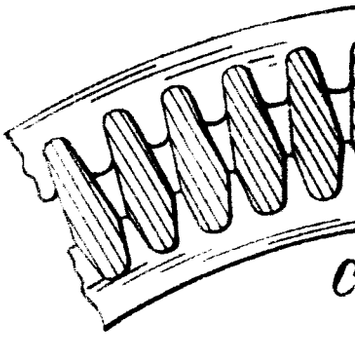
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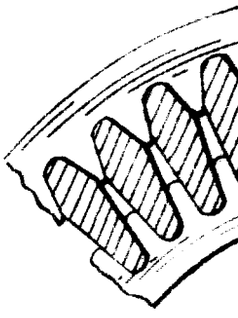

Fig. 8.

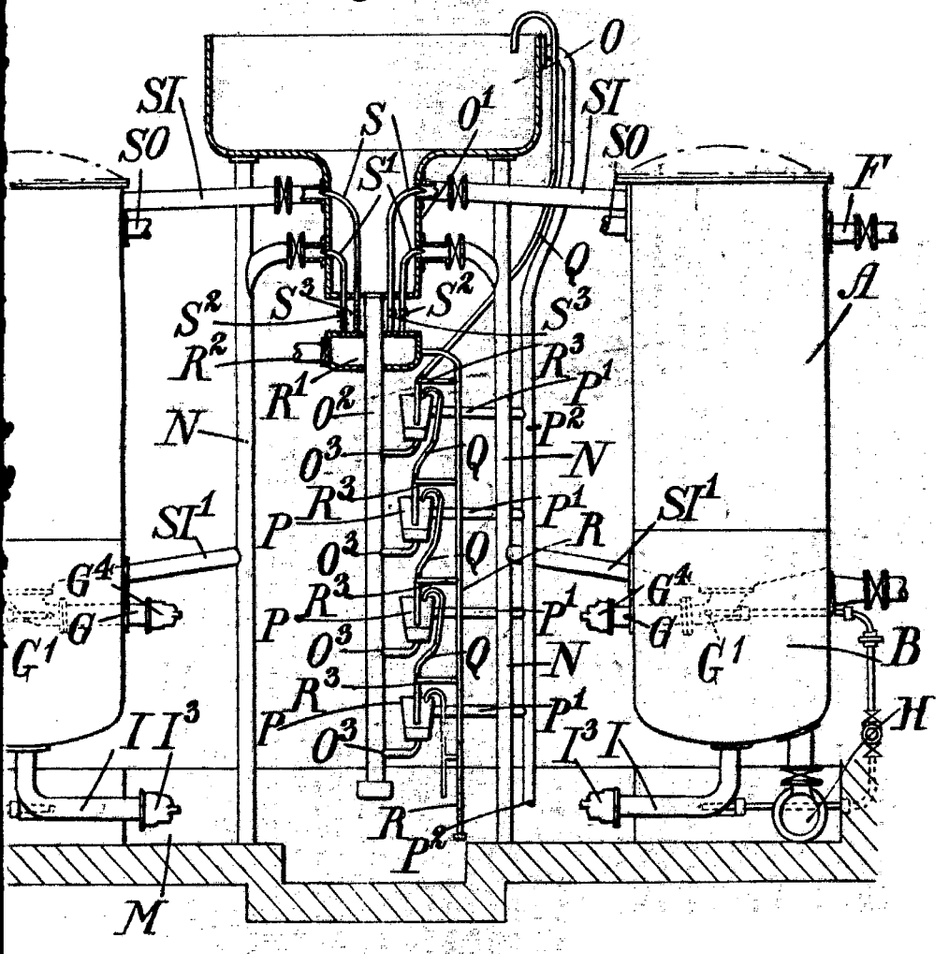
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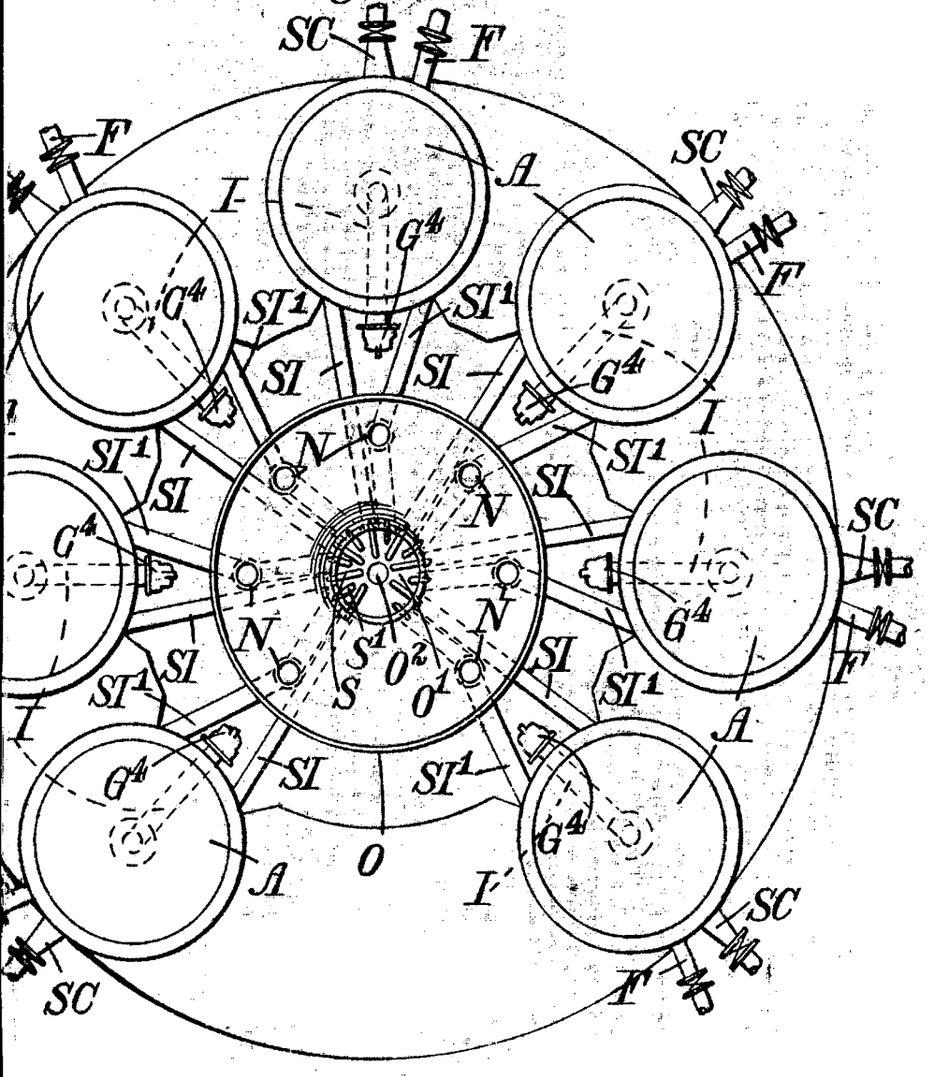
Fig. 9.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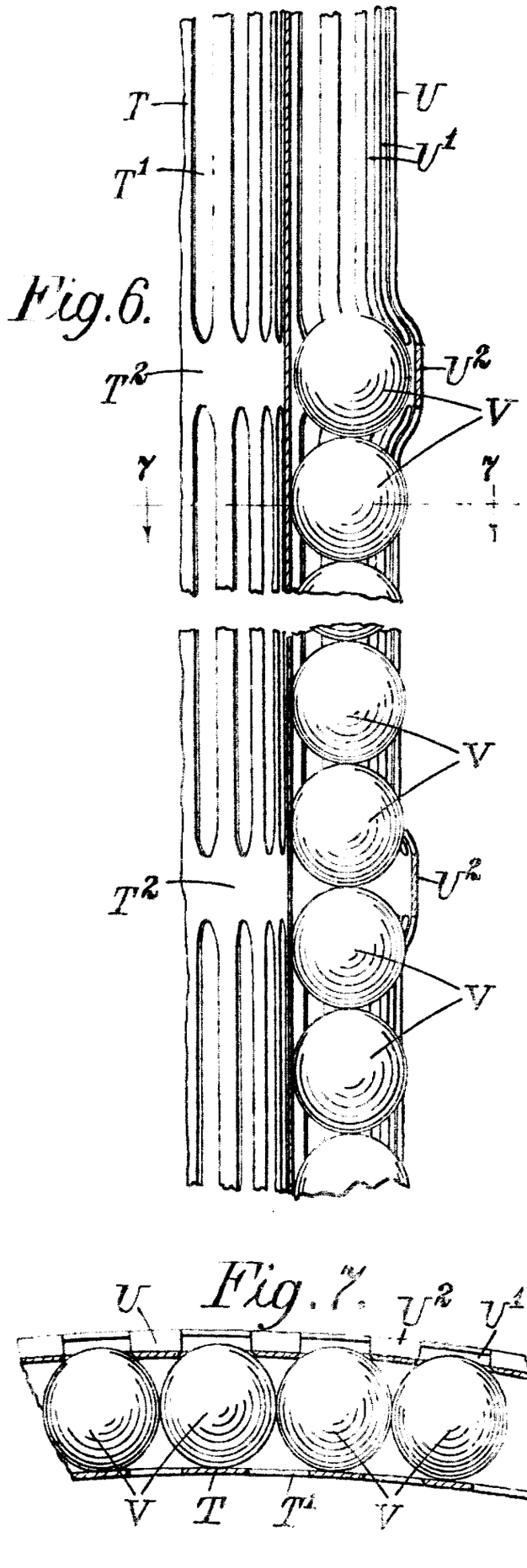

Fig. 6.

Fig. 7.

8+c 2/17
30.9.16 S 32

MYSORE.

1½a

POWER OF ATTORNEY.

IN THE MATTER of the Inventions and Designs Regulation, 1894, of the Government of Mysore,

and

IN THE MATTER of NEIL McKECHNIE BARRON of 28, Brackley Road, New Beckenham, Kent, England, Engineer, an Inventor.

I, the above-named NEIL McKECHNIE BARRON do hereby retain, constitute and appoint the Firm of REMFRY & SON, Solicitors & Patent Agents, of Calcutta, British India, as my Agents and Attorneys to apply for and obtain from the Government of Mysore and keep in force an Exclusive Privilege or Letters Patent for "IMPROVEMENTS IN OR RELATING TO SAND-FILTERS" and I authorise them to sign my name to such papers and writings and do such acts regarding the same, including the appointment of a substitute or substitutes, as may be necessary or expedient.

Dated this 5th day of March 1920.

SIGNED, SEALED and DELIVERED :
at London, England :
in the presence of:- :

Neil McKechnie Barron

Two Witnesses:

Edward J. Dollemore
Engineer, of 112 Hatton Garden London.

Arthur Abbey
Engineer 112 Hatton Garden, London England

(32)

G.O. No. 198-19-2

Duplicate.

(To be returned to the General and Revenue Secretariat for being placed in the file.

1. No. 245
2. Date of Remittance 21 April 1920
3. From whom received Messrs Remfry & Son, Calcutta.
4. Date of receipt of amount in the General and Revenue Secretariat 12-4-20
5. On what account Appln Fee, Order No 33 dt 19-20 by the Baron England
6. Amount (in figures and words) Rs 10/- Rupees Ten only
7. The head to which it should be credited.

(To be filled in by the Treasury.)

K. Subbarayappa
for Chief Secretary to Government,
~~General Department.~~

The above amount has been duly received and credited in the Treasury on this date.

Date 24-4-20

Hd. Acctt. *Treasurer.* *Try. Officer.*

N. B.—Both the counterfoil and the duplicate to be returned to the General and Revenue Secretariat duly signed by the Treasury Department.

G. R. S. VI—s·v/14]

Assignment letter sent on 26/4/20. 20 for Endorsement issued

2 drafts

324

DRAFT.

SUBJECT.....

.....

.....

Section. Ly. M.
File No. 198-19
Serial No. 3

Diary No. of letter replied to.....

Ly 24/1-28 sent Kent

GENERAL AND REVENUE SECRETARIAT
( )
, the ....*191* .

To

The Superintendent
of Stamps
in Mysore

Date of issue..... 22/4 .....

Signed by..... M~ Des .....

Has the honor to forward herewith a Power of Attorney executed by Mr. Neil McEachnie Barron of 28, Brackley Road, New Beckenham Kent, England, constituting Messrs. Remfry & Son, Calcutta, as. Agents in respect of ~~their~~ his invention for "Improvements in or relating to sand filters" and to request that the same may be impressed with the Mysore General Stamp of the value of Rupee One, also herewith forwarded, and the Power returned to this office.

By Order,

Des 17/4/20

For Chief Secretary to Government.

G. R. S. VI.—s-v/16]

2 Dep.
35

19/4

DRAFT.

SUBJECT.....

.....

.....

Section. G.M.
File No. 198-19
Serial No. 4

Diary No. of letter replied to. 1768

No..... G 2429 Encl.

To

The Secretary to the Board for Chemical and Industrial Research and Scientific advice.

GENERAL AND REVENUE SECRETARIAT,

( )

, the.....*191* .

Date of issue..... 22/4

Signed by..... M DCS

Has the honor to forward herewith, the opinion of the Board for ~~report~~ under Sec. 6, Cl. (2) of the Mysore Inventions and Designs Regulation, XI of 1894, an application for leave to file a specification of an invention for "Improvements in or relating to sand-filters" by Neil McKechnie Barron of 28, Brackley Road, New Beckenham, Kent, England.

By Order,

DCS
17/4/20

for Chief Secretary to Government.

Tel

M/S
14.220

19/4

G.M. 198-19-b

36 D.No/17

Letter No.412, dated ~~26~~ 26/27th April 1920 from the Superintendent of Stamps in Mysore to Chief Secretary to Government.

(For the original, vide G.M. file no. 197-19.) 8/18582

*****

I have the honour to forward herewith duly ~~xxxxx~~ stamped the two Powers of Attorney received with your Nos.G.24128/G.M. 198-19-2 and G.24130/G.M. 197-19-3 dated 22nd April 1920, and to request the favour of an acknowledgment.

x No. 4.

" C O P Y "

D.C. Subbarayappa.

For Chief Secretary to Government.

ACH.2.

37

Gy.M.198-19-6.

(For the original
see G.M.file 197-19.)

No. Gy.25534

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE

GENERAL AND REVENUE SECRETARIAT

Bangalore, dated 7th May 1920.

From

C. S. BALASUNDARAM IYER, Esqr., B.A.,

Chief *Secretary to the Government of His Highness the Maharaja of Mysore*

To

M. Srinivasamurthi, Esqr.,

Superintendent of Stamps in Mysore.

Sir,

I am directed to acknowledge the receipt of the two Powers of Attorney duly stamped and forwarded with your letter No. 412, date the 26th/27th April 1920.

I have the honor to be,

S i r,

Your most obedient servant,

Dft) dcg

for Chief Secretary to Government.

SV/2.

38

Board for Chemical and Industrial Research
and Scientific Advice.

Bangalore, Dated 23rd Aug. 20. 192

DIARY NO: 3042
19 -19
Section: Jm
File No: 1987
Serial No: 7

No. 1 Encl 1
Ch Secy
21 AUG 1920 FROM

S. G. SASTRY, ESQ., B.A., M.Sc., F.C.S.,
SECRETARY, BOARD FOR CHEMICAL AND INDUSTRIAL RESEARCH
AND SCIENTIFIC ADVICE, BANGALORE.

66.9

CHIEF SECY'S OFFICE 4/8/20 IV
MINOR Depts:
24 AUG 1920

C.S. Balasundaram Iyer, Esq., B.A.,
Chief Secretary to Government of
His Highness the Maharaja of
Mysore, B a n g a l o r e.

SIR,

Refce:- No.G.24129/Enc. G.M. 193-19-4 dated
22nd April 1920.

With reference to the above, I am directed to state that leave may be granted to file a Specification of an Invention for "Improvements in or relating to sand Filters" by Mr. Neil McKenhenie Barron of 28 Brackley Road New Beckenham, Kent, England.

I have the honour to be,
Sir,
Your most obedient servant,

S G Sastry
Secretary.

G. R. S.VI—s.-v/21]

Government of Mysore.

GENERAL DEPARTMENT.

Register No. 33 ..... of 1919-20.

Bangalore, the 2/9/1920

WHEREAS an application, dated the 5th day of March 1920 and received on the 12th April 1920, has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by Mr. Neil McKechnie ~~Batten~~ Barrow, of 28, Brackley Road, New Beckenham, Kent, England, Engineer (hereinafter referred to as "the applicant") for leave to file a specification of an invention for Improvements in or relating to Sand-Filters

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

30.8.20

For Chief Secretary to the Govt. of Mysore,
~~General Department.~~

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the Twentieth day of October 1920.

Dft.

For Chief Secretary to the Govt. of Mysore,
~~General Department.~~

(Section 8 of the Inventions and Designs Regulation, 1894.)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

(*a*) the time for making a payment shall not in any case be enlarged for more than three months ; and

(*b*) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

W D 02300—GPB - 500—24-11-16

G. R. S. VI—s-v/13]

DRAFT. Drafts

41

SUBJECT.....

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.....

Section. S. W
File No. 198-19
Serial No. 9

No. 5072

Diary No. of letter replied to 3042

GENERAL AND REVENUE SECRETARIAT,
( )
, *the*.....*191* .

Date of issue.....

Signed by.....

To

Messrs Remfry and Son.
Patent and Trade Mark Attorneys
Calcutta.

GENTLEMEN,

With reference to your letter ~~No.....~~
dated the 5th April 1920.
I am directed to forward herewith G. O.
No. G. / G. M. 5071 dated the 2/9/20
191 , authorizing Mr Neil McKechnie Barron
Barron, of 28, Brackley Road,
New Beckenham, Kent, England, Engineer,
to file a specification of an invention for
Improvements in or relating
to Sand-filters.
.....
and to request that the fact may be communicated to the party concerned.

~~I have, etc.~~
Yours faithfully,

DCS
2/9/20
Dy Chief Secretary to Government.

Dy 30/8/20

Rec'd 30.6.20

DIARY NO: 5342

42

To Section: 19 -19
File No: 198 19 10
Serial No:

REGISTERED.

THE ~~CONTROLLER OF PATENTS~~, SECY TO THE GOVT OF MYSORE,
~~PATENT OFFICE~~, GENL. & REV. DEPTS.,
~~CALCUTTA~~. BANGALORE,
MYSORE.

FROM

REMFRY & SON,
PATENT & TRADE-MARK ATTORNEYS,
CALCUTTA.

Dated CALCUTTA, the 14th October 1920.

GEN & REV. SECT
21 OCT 1920
SECRETARIAT.
CHIEF SECRETARIAT
IV
MINOR Depts:
27 OCT 1920

DEPT.	P.	FILE LR.	M.
FILE INDICATION			
Mysore Pats. (Genl)			

SIR,

re N. M. BARRON. (MYSORE)
No. 33/19-20 dated -
(Brit. No. 8402/19 dated 3/4/19.)

Pursuant to the Order granting leave in this matter dated 2nd September 1920, Register No. 33 of 1919-20, we have the honour to forward herewith 4 copies of the Specification of NEIL McKECHNIE BARRON, of 28, Brackley Road, New Beckenham, Kent, England, Engineer, in respect of his Invention for "IM-"PROVEMENTS IN OR RELATING TO SAND-FILTERS".

The abovementioned Order is enclosed and we solicit the favour of your filling in the Certificate at foot thereof and having same signed.

A Post Office Order for Rs.30/- is sent today.

We have the honour to name our Office in Calcutta, as address for service under the Act.

We have the honour to be,
Sir,
Your very obedient servants,

Enclos:-
4 Specns.
Order.

By P.O.O:-
Rs.30/-/-

I.M.B.

P/O (Genl.) 1,000—8-6 20 [7-6-18—4-2-14—17-3-11].

Enclosed

Jud 928 - 19-10(a)

Duplicate.

(To be returned to the General and Revenue Secretariat for being placed in the file.

1. No. 315

2. Date of Remittance 13th Nov 1920

3. From whom received Messrs Kemp and Co for Calcutta

4. Date of receipt of amount in the General and Revenue Secretariat 20.10.20

5. On what account ~~Stamp fees for Jud 928 of 19~~ 19 per Miss McKechnie Barnes, Kent, England

6. Amount (in figures and words) Rs 30 Rupees thirty only

7. The head to which it should be credited.

.....

(To be filled in by the Treasury.)

D. Subbarayappa.

for Secretary to Government,

~~General Department.~~

The above amount has been duly received and credited in the Treasury on this date.

Date 13/11/20

Hd. Acctt. *Treasurer.* *Try. Officer.*

N. B.—Both the counterfoil and the duplicate to be returned to the General and Revenue Secretariat duly signed by the Treasury Department.

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE.

GENERAL AND REVENUE SECRETARIAT

Bangalore, Dated 18/11/1920

No. G 9705

Gen. 198-19-11

NOTIFICATION.

(PATENT)

The following specification of an invention has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The inventions and Designs Regulations) and is open to inspection at the Mysore Government Secretariat on application to the Chief Secretary to the Government of His Highness the Maharaja of Mysore, and on payment of a fee of one Rupee.

By Mr Neil Mc. Kechnie Barron, of 28, Brackley Road, New Beckenham, Kent, England Engineer.

"Improvements in or relating to sand-filters"

By Order,

8/11/20

for Chief Secretary to Government.

8/11/20

To

The Compiler, Mysore Gazette, for publication.

G. R. S. VI—s-v/18

3 DRAFT.

SUBJECT.....

.....

.....

No.

Section. for
File No. 198-19
Serial No. 12

Diary No. of letter replied to....5342

G 9706(2)

GENERAL AND REVENUE SECRETARIAT
( )
, *the*.....*191* .

To
Messrs Remfry and Son,
Patent and Trade Mark Attorneys
Calcutta

Date of issue..... 18/11 .....

Signed by..... M Dey

~~Sir~~ Gentlemen,

With reference to your letter dated 14-10-1920 I am directed to forward copy of a Notification No. G 9705 dated 18/11/20 issued by this Government in regard to the invention filed by you under Regulation XI of 1894 (The Inventions and Designs Regulations.)

The order granting permission to file specification is herewith returned, with the certificate at foot, duly filled in and signed.

~~I have, etc.,~~ yours faithfully,

DEY 8/11/20

for chief *Secretary to Government.*

8/11/20

G. R. S. VI.—s-v/12]

DRAFT.

SUBJECT.....

.....

.....

Section. J. W
File No. 198-19
Serial No. 13

Diary No. of letter replied to 5-342

No. 19707 9

GENERAL AND REVENUE SECRETARIAT,
( )
, the.....191 .

(1) *The Superintendent, Govt. Museum.*
(2) *The Chief Engineer of Mysore.*
(3) ~~The Secy Board for Chemical and Industrial~~ Research and Scientific Advice

Date of issue 18/11

Signed by.....

Has the honor to forward herewith for ~~recording~~ his office copy of a specification of an invention for "Improvements in or relating to sand-filters" by Mr. Neil Mc Kechnie Barron, of 28, Brackley Road, New Beckenham, Kent, England, Engineer

By Order,

8/11/20

for Chief Secretary to Government.

8/11/20